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ABSTRACT

The state of the art in the implementation of education innovation is assessed in three parts: (1) the identification of promising theories, important issues, and proven implementation strategies with emphasis on practical implications: (2) a review of research directly related to the development and implementation of new occupational education programs: and (3) a distillation of the literature in the form of generalizations about innovations and innovative organizations. Four models of change which have guided innovation (the Research, Development, and Diffusion: Problem-Solver: Social Interaction: and Linkage models) are proposed. The process of adoption is represented by stages of adoption behavior and by adoption and diffusion curves. The Power, Re-Educative, Manipulative, and Marketing Technology Strategies for implementation are also identifed and reviewed. A review of major studies of innovation in vocational education concludes that the ability to be innovative includes a perceived need to change, acquisition of a well-packaged program which responds to that need, and some level of commitment and administrative ability. Five organizational variables are identified as factors which influence the implementation of innovation: financial resources, human resources, the planning process, communication channels and patterns, and training. Aspects of the innovation itself which are identified as affecting its successful implementation are adaptability and utility. (YLB)

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A Review of the Change Literature

with

Implications for ISSOE Dissemination

Vernon Beuke and Steven Farrar

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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ABSTRACT

The purpose of this paper is to examine the state of the art in the implementation of educational innovation. The report is divided into three parts: the identification and review of promising theories, important issues, and proven implementation strategies; a review of research directly related to the development and implementation of new vocational education programs; and a distillation of the literature in the form of generalizations about innovations and innovative organizations.

The paper describes four models of educational change which have guided research into the change process. Two opposing theories of the adoption process are identified and discussed. The practical implications of each are stressed.

Major studies of the innovation process in vocational education are summarized. Our conclusion is that the ability to be innovative includes a perceived need to change, acquisition of a well-packaged program which responds to that need, and some level of commitment and administrative ability.

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INTRODUCTION

The existing literature on innovation is thought by many critics to be inadequate from a scientific viewpoint. Giaquinta (1973) characterizes the bulk of the research as "show and tell" literature which evidences little methodological sophistication. Poor conceptualization of the change process is a problem cited by Klees (1978). Berman and McLaughlin (1978) note that few studies have attempted to "test theories of change or identify components of success or failure." Others, including Mohr (1978) and Fullan (1978), are critical of the literature but are optimistic that much of this work is prerequisite to the formulation of an adequate theory which might guide practice.

However, many respected researchers believe that some basic principles of innovation implementation are generally agreed upon, and are applicable to various disciplines. Further, many others can provide direction for fields other than those specifically studied. Zaltman and Sikorski (1977:5) appraise the quality and importance of the existing knowledge base thus:

> As one might guess, along with the great diversity characterizing nearly all aspects of diffusion research, there comes a degree of contradiction of "poorness of fit" when comparing particular results or observations provided by different studies. Most importantly, however, there has also been a considerable degree of agreement among diverse studies on one or another basic issue. There are exceptions to nearly all these areas of agreement, but the issues of agreement represent a convergent validity: the same phenomenon being observed in different contexts and in different ways.

Rather than presenting a thorough review of an immense and repetitious literature, this report assesses the state of the art in the implementation of educational innovation by (1) identifying and reviewing promising theories, important issues, and proven implementation strategies, and (2) reviewing research which is directly related to the

development and implementation of new programs in vocational education. Part III provides a distillation of the review of the literature in the form of generalizations about innovations and organizations which are widely supported by research.

PART I

PROMINENT ISSUES AND THEORIES IN THE INNOVATION LITERATURE

Reaching a peak of activity in the mid-1960's, the study of innovation and innovative behavior has captured the attention of social scientists over the past quarter-century. Of the many types and contexts of innovation, educational innovation has been the most "popular"; it accounts for approximately 700 of the 4,000 innovation studies identified by Havelock et al. (1975). Quantitative research accounts for roughly half of the total, with theoretical studies and case studies amounting to twenty-five and seven and one-half percents respectively.

Researchers have usually focused their investigations on: (1) the origins and originators of innovation; (2) the adopters of innovation; (3) the process of innovation; (4) the product or outcome of innovation; or (5) some combination of these variables. Practitioners, or users, have been the subject of well over fifty percent of the studies while developers of innovation amount to less than ten percent of the citations.

Several important conceptual and practical issues are relevant to our study of innovation. Although no consensus is reached on any of the issues, it is possible to define the issues and problems and state the major arguments, both pro and con. These issues are related to (1) defining the research problem through model-building; (2) the process of innovation; (3) the dimensions of change; and (4) strategies for the implementation of innovation.

MODELS OF CHANGE

Because there is a myriad of elements, factors and variables which impinge on the process, the study of innovation is extremely complex. As a result, those who study innovation have developed a variety of research paradigms or "models" to guide their research activities. These models of educational change differ in their emphasis on: (a) the roles of potential users, (b) the acquisition and application of resources outside the "adopter system," and (c) the extent to which it is prescriptive or descriptive. Havelock (1969) identifies four models of educational innovation common to the literature. These are presented below:

Model 1 - The Research, Development and Diffusion Model

This model is based on the assumption that agencies outside the system of potential users should develop the innovative products and present the completed package to users--schools and teachers. An early reliance on this model by policy-makers resulted in the development of large numbers of innovative programs and materials which subsequently failed to be successfully implemented in schools (Lippitt, 1965). The major criticism of this model is that little attention is focused on the user system. The assumption that users will automatically adopt an innovation merely because information about its value has been given them is not supported.

Model 2 - The Problem-Solver Model

Many current models for effecting change in education emphasize the importance of close relationships between external resources and potential users. They differ, however, in the presumed nature of these relationships and their importance relative to the success of attempts to introduce innovative change.

The Problem-Solver Model is described as one in which the user identifies needs and determines problem areas. Only in the search for solutions do external resources play a role. Once the resource provides a potential solution, the user adopts the suggested innovation, applies it, and evaluates its success. Rather than stressing the external resource, this model emphasizes the importance of the user as the primary source of interest in and awareness of the need for change. Manneback (1973) advocates this model in the early stages of his process model. The potential users (educators) are involved in the planning and analysis of needs assessment before the innovation is selected. Jung and Lippitt (1966) also employ the Problem-Solver Model when they focus on the teaching staff as the agents who set goals, define needs, and seek solutions with external resources acting only as consultants.

Model 3 - The Social Interaction Model

A model that places emphasis on the external resource as the initiator of the change strategy is called the Social Interaction Model (Havelock, 1969). This model stresses the influence of opinion leaders. The success of innovations is based on personal contacts between resources and key users in the user system. Griffiths (1964) provided an example of this approach in his theory of administrative change. He proposed that change is likely to be initiated from outside the user system because the user system is in a steady state and resistant to change from within. Carlson (1964) also falls into this category with his model for the adoption of modern mathematics concepts. The role of the superintendent as a key opinion leader was directly related to the successful adoption of "new math."

Model 4 - The Linkage Model

Havelock (1969) proposes a Linkage Model which combines elements of the Problem-Solver and Social Interaction models. In this model, both

resource and user systems unite in close reciprocal communication to diagnose problems and search for solutions. The resource system continually stimulates the user system so as to develop solutions to problems, and the user system, in turn, stimulates the problem-solving process of the resource system.

Analysis of the Four Models

These four models of educational change are based on a rationalistic bias of human behavior which assumes educators have clear goals, possess technological sophistication, seek better practices, are able to identify superior products and processes, and are eager and able to adopt proven innovations. There is little evidence, however, to support these assumptions. Indeed, the evidence suggests the contrary. Thus, while the heuristic value of the models is not questioned, the models may offer little practical guidance to those implementing new occupational education programs.

THE PROCESS OF ADOPTION

Research concerning the process of innovation has resulted in the identification of several stages or phases of adoption behavior. These phases are not mutually exclusive, but appear to represent fairly typical patterns of activity in the adopting individual or organization.

Five phases have been proposed by Rogers and Shoemaker (1972) and Beal and Bohlen (1962). They are: *awareness, interest, evaluation, trial* and *adoption*. *Awareness* refers to the initial point at which the user knows the innovation exists. *Interest* is developed as the user seeks more detailed information about the nature of the innovation. *Evaluation* involves the serious consideration of the product or program in question, and an attempt on the part of a potential user to assess its probable value to him or her. If the user is positively disposed to

the potential value of the product, then the *trial* period is entered. During this phase the product is used on a small-scale experimental basis. If the trial test is successful, then *adoption* results and the product is used on a full-scale basis.

Several other theorists, including Miles (1963) and Farr (1969), propose similar models with some modifications. For example, Farr groups the first four of these phases into two conceptual units--an information stage and an evaluation stage. *Awareness* and *interest* comprise the information stage because these phases involve providing general information about the innovation to the potential user. The *evaluation* and *trial* phases are grouped together as an evaluative stage because in these phases specific information related to the user's needs is provided and planning for the experimental field test of the product ensues.

A consumer-oriented framework is proposed by Miles (1964). Viewing change from the user perspective, he identifies four phases of educational change. These are: (1) Design of the Innovation, (2) Local Awareness and Interest, (3) Local Evaluation, and (4) Local Trial. Rogers and Shoemaker's *awareness* and *interest* stages occur concomitantly, according to Miles, and *adoption* is seen as an extension of the *trial* stage.

More recently, Hall and Loucks (1977) have developed an "implementation model" based on a set of seven scales which represent a progression of utilization ranging from "Non-use" through "Renewal." Each stage is followed by a decision which leads the user to the next level of use. The decision pattern suggested by these researchers implies that innovation users at different stages exhibit quite different concerns about the new practice or product. It further suggests that intervention tactics, which will be discussed in more detail in the next section, must be synchronized with the user and his/her stage of use.

DIFFUSION CURVES

The adoption process may also be viewed from the "rate of adoption" perspective. Here it is thought that individuals and organizations tend to become involved with a given innovation at a fairly predictable rate over a long period of time. When adoption rates are plotted, the resulting growth is depicted by a normal "*S*" curve. Havelock (1969) identifies six levels of individual user involvement ranging from slight involvement, at the beginning awareness stage, to full commitment at the "automatic" use stage. High involvement stages correspond to information-seeking behavior and an effort to put the innovation into regularized use. Decreasing involvement is thought to develop after the innovation has become routinized.

According to Rogers (1962), Carlson (1965) and Zaltman and Duncan (1977), the diffusion of an innovation through a population may be pictured as a normal curve. After the "invention" of a new innovation, a few individuals find out about the new product, idea, or process and some of these "early adopters" decide to try the innovation. Through some communication process, these early adopters relate their experience to other potential users, and some of these individuals, the "early majority," decide to try it out. The practical implication of this theory is that the adoption process has critical points which are empirically based. Further, exponential gains in adoption are predicted after approximately twenty percent of potential users have adopted the innovation.

Based on evidence derived from the adoption curve, two additional observations are in order. The first is related to diffusion and implementation strategies. Since early adopters or opinion leaders have been shown to differ in many important ways from later adopters, different diffusion and implementation strategies are required for each group, based on their characteristic modes of behavior. A diffusion strategy must also be responsive to an "individual adoption curve." Individuals who are at the awareness stage on the curve quickly reach a saturation

level where expensive information literature is simply ignored and wasted. Similarly, an awareness campaign can be quite useless if the majority in an adoption group is actively seeking detailed, "how-to" information.

The second observation concerns the kind of diffusion or implementation effort a change advocate should plan. Early efforts should incorporate product promotion to audiences selected to give the innovation a fair trial. Resources must be available to induce this group to adopt the innovation. At this stage, product quality must be monitored to insure a favorable evaluation by the selected early adopters. In essence, early diffusion/innovation efforts must incorporate a "push" strategy.

Upon reaching the critical mass of approximately twenty percent, a modification of the strategy seems to be in order. Whereas a push strategy was required initially, the change advocate should prepare to become responsive to a "pull" from the remaining population of potential users. Major elements of the new strategy are: plentiful, clear, accurate information; availability of trial materials; and provision of demonstration sites and knowledgeable consultants.

STRATEGIES FOR INNOVATION IMPLEMENTATION

Research has shown that individuals and groups vary widely in their willingness to adopt new products and practices. And, as pointed out earlier, different innovation strategies are appropriate for different user populations and at different stages of the adoption process. This section reviews major characteristics of four strategies for innovation: The Power Strategy, the Re-Educative Strategy, the Manipulative Strategy and the Marketing Technology Strategy.

Power Strategy

A power strategy is generally required when the change agent feels voluntary action by the intended adopter is unlikely or when the adopting system perceives little need for change. It is also frequently used simply because of the nature of the relationship between the change agent and the intended adopter. For example, the courts, in their legal-obligatory relationship to citizens, use a power strategy through legal mandates. When the courts order schools to desegregate, they are invoking a power strategy, using legal sanctions and authority to enforce a change in the schools' operations.

Power strategies require a substantial control over key resources. Moreover, Zaltman et al. (1977) believe "The success of a power strategy rests on the extent to which the sources of power are really valued or important or compelling."

As in all implementation of change, the adopting system requires sufficient resources to effect the intended change. If such resources are beyond the capacity of the adopting system, they must be supplied by the change agency.

There are four problems endemic in the use of the power strategy. First, it is likely to generate resistance and/or sabotage. This sabotage can range from simple defiance in implementing the change to overt attempts to scuttle the whole program. Thus, the use of surveillance to insure compliance and the administration of rewards and punishments are required. The cost of surveillance obviously increases with growing resistance, which means the power strategy can easily consume major resources as it attempts to maintain control.

Second, the initiation phase of implementation is especially vulnerable to resistance by every segment of the adopting system. Those change advocates dealing with teachers must be particularly cognizant of this

point because the behavior of teachers is seldom subject to direct intervention by outsiders, including state education department personnel. This is due to institutional structure, claims to professionalism, collective bargaining agreements, and traditions such as academic freedom.

Third, because motivation for change does not originate in the individual or organization, and because resistance is engendered, the intended change tends to vanish as the forces and resources of the power strategy are withdrawn. Thus, when funds for an innovation are withdrawn the intended change disappears.

Fourth, the power strategy develops no commitment to the change itself, which ultimately renders the maintenance of the intended change unlikely.

Regardless of the built-in weaknesses of this strategy, it seems to work rather well in actual practice, especially when used in conjunction with other strategies. Appeal to legitimate authority carries considerable power. A ruling by a regulatory agency or by persons in respected authority roles is generally accepted and acted upon by the vast majority of our society. The power strategy is most useful when it appears that the target system will not be inclined to accept the change in response to other strategies, or when constraints are particularly tight and implementation is crucial.

Re-Educative Strategy

Re-educative strategies rest on two basic assumptions: one, that people are guided by reason; and two, that people will follow their rational best interest when it is revealed to them. The major emphasis here is on the communication of objective, accurate, and unbiased fact. The strategy also assumes that proper use of any new invention will require that proposed users learn new knowledge, attitudes, skills and behaviors.

The re-educative strategy of Chin and Benne (1969) includes presenting unbiased facts with attempts to motivate and stimulate change in behaviors, values, role relationships, etc. Because the change is freely chosen by the adopting system, "a high degree of commitment to the change itself is developed." However, knowledge development and the dissemination of information remain critical.

Such a strategy faces many obstacles in school settings. It essentially assumes that if you show people the light, they will flock to it. However, "it is only in the past decade that researchers have come to grips with the problem that informing practitioners about alternatives is rarely enough to produce change" (Zaltman et al. 1977). Such a strategy generally requires well-defined, clearly agreed-upon goals. This seldom occurs in the political world of education. Further, it is subject to what Zaltman and Duncan (1977) call the rationalistic bias--the notion that people behave rationally without emotional attachments. Evidence from political science and organizational behavior suggests that most decisions have some ego and emotional involvement and that change in this area is best effected not with reason alone, but by substituting another emotional involvement for the original.

Manipulative Strategy

Manipulative change, according to Zaltman and Duncan (1977), involves persuasion through the presentation of biased information and use of facilitation methods that cause change to be implemented effectively. This strategy, more than the others, requires an in-depth knowledge of the target system, the change agent, and the change itself.

In the power strategy, avoidance of punishment was made contingent on change. In the manipulative strategy, resources are made available to encourage some desired change. One of its major strengths "is the tying of motivators to change itself" (Zaltman and Duncan 1977). Two persuasion tactics, often used concurrently, involve the attempt to make the desired

change appear more attractive to the user audience coupled with the effort to induce the clients to look critically at their current practices or product. It is essentially a combination of the power and re-educative strategies in that it recognizes resistance to change and provides reasons for acceptance of the innovation.

Greiner (1967) notes that changes in the internal and external environment may take place when change is imminent. He found many instances where change was preceded by a build-up of outside pressure on and internal tension within the target system. A manipulative strategy seems well suited to such situations, which are probably more emotionally-based than based in reason. Individuals are not totally rational in periods of stress and change--a factor often ignored in many change strategies.

Marketing Technology Strategy

The marketing approach to implementing educational innovation seems to be an important alternative strategy because marketing implies performing those activities which improve the exchange process. Specifically, marketing technology involves the identification of marketing opportunities, coordination of the delivery of new products, and feeding market information back into the production activity. Wirt et al. (1972) define marketing as a "top-down" strategy which depends on a centralized organization, capable of selling to consumers who have had minimal input into the development of the product. A measure of product control is available, however, since the decision to buy a product rests with the consumer. Therefore, responsiveness to user needs is a critical factor for the economic survival of the producers.

It would seem that marketing takes the focus off the product and puts it on the user's needs. Since the product must be responsive to the needs and wants of the user system, products are developed from the user's viewpoint rather than the producer's. Products may develop in basic

research; but from that point forward they are developed and refined in response to user considerations.

A marketing technology strategy is not incompatible with other strategies. Kotler et al. (1977) view it as a step beyond other alternatives. The marketing concept recognizes the need for close attention to product features, opinion leaders, the growth curve, and the life-cycle of new products. However, the major consideration is whether the product is perceived as worthy of purchase and use by the consumer.

Zaltman, Flori, and Sikorski (1977) provide a list of nine marketing strategies and their potential application to educational change. These are:

Market penetration:

> How can more teachers be stimulated to use existing curriculum innovations, publications, and innovative practices in classroom teaching?

Market Development:

> Do parents of school children constitute a potential market for research products?

Reformulation strategies:

> How might existing educational innovations be changed to promote more extensive use?

Market extension strategies:

> Should different versions of an innovation be developed for use by different types of students, teachers, or communities?

Replacement strategies:

> Is it possible to reach specific goals by more effective or efficient means?

Marketing segmentation/product differentiation:

> Similar to market extension in that new clients are sought through modifying and/or supplementing present products.

Product line extension strategy:

> What characteristics should a new product (e.g., a teacher) possess which are significantly different from present products?

Concentric diversification strategy:

> What new products would attract clients who would be likely to use existing products?

Forward/backward integration strategy:

> Is it possible to extend the range of existing products, i.e., from elementary science curriculum to high-school science or from high-school science to college science, or vice versa?

SUMMARY

This section of the paper has reviewed the change literature to identify promising theories, important issues, and proven implementation strategies. Four models of change were proposed which have guided innovation research. The process of adoption was represented by stages of adoption behavior and by adoption and diffusion curves. Finally, four strategies for implementation were identified and reviewed. In each case, the practical implications were stressed rather than the theoretical or research applications.

PART II

REVIEW OF RESEARCH IN OCCUPATIONAL EDUCATION INNOVATION

Our review of the innovation literature revealed very few studies of the innovation process in occupational education. Further, most of these used survey research methods shown by Fullan and Pomfret (1977) to be inadequate in the study of innovation implementation. It is obvious, however, that the referenced studies provide some guidance for implementation of innovative vocational programs.

Project Baseline (Lee 1975) reported on fifty-four exemplary vocational education projects. Two of the variables studied were "impact" and "success." Of the fifty-four projects, forty were thought to have some impact beyond their local school district, with twelve reporting extensive impact throughout their own state. Project success was defined as the degree of continuation upon termination of federal funds. Thirty-six projects, or sixty-seven percent of the sample, were continued at a level equal to or greater than during the federally-funded period and fifteen or twenty-eight percent reported reduced continuation.

Project Baseline reported problems encountered by project directors including: the lack of continuity, local support and confidence during the initial funding periods, often due to the problem of late funding; isolated cases of apathy or non-support by non-project personnel; and lack of clearly defined goals and objectives. Additionally, the achievement of project goals within the time constraints was difficult if planning had not occurred prior to funding.

A study by Berman and McLaughlin (1975) focused upon the nature, permanence, and extent of educational innovations which have been associated with four federally-funded programs. The study had two primary foci:

(1) the process of innovation, and (2) the factors affecting implementation and continuation of educational innovations.

With reference to the process of innovation, the authors conclude that the modes of the initiation stage were typically either opportunistic or problem-solving in nature. The projects which were successful in the implementation stage were characterized by mutual adaptation of innovations. A similar conclusion is reached by Bowers (1978).

Incorporation of project results occurred in a variety of forms, but projects which replaced existing practices tended to be incorporated more frequently than those projects which supplemented existing practices. Incorporation at the individual school building level was more likely to occur if an emphasis was placed on training for practical classroom issues and if the project used locally developed materials. Incorporation at the school district level was typically determined on the basis of whether the project was successful, affordable, important to the district's priorities, and politically acceptable. The opportunistic mode of initiation usually resulted in a negative determination whereas a problem-solving mode resulted in a positive decision concerning incorporation.

The findings relevant to the implementation and continuation of educational innovations included three areas: project characteristics, institutional settings, and federal policies. Project characteristics, such as implementation strategies and monitoring operations, influenced the success of the project. A receptive institutional setting was essential for a project to succeed. Factors such as commitment by principals as well as top-level administrators influenced the success of the projects. Berman and McLaughlin (1975) report that federal policies had little influence on implementation and continuation.

Hull and Bina (1977) investigated administrative and organizational variables which influence continuation and dissemination of exemplary

vocational education projects. The researchers collected survey data on fifty-four geographically diverse projects which were funded by Part D Funds of the Vocational Education Act. Of the fifty-four projects, thirty-eight (70%) were found to have survived termination of federal funding. Over half of the continuing projects relied primarily on local funding, but some secured continued funding from state and federal sources.

Several administrative variables were found to have a positive influence on project continuation. Among these were: use of an experienced project director, adequate preplanning at the local level, weekly staff meetings, monthly in-service training sessions, and frequent formal and informal evaluation. Formalized personnel procedures and type or extent of dissemination activities were not influential in continuing projects past termination of federal funding.

Dissemination (transportability) of the project was measured by identifying replication sites within the host's state. A total of thirty-nine replication sites were included in this part of the study. Several generalizations were possible based on this limited survey. With respect to channels and patterns of communications within the state education system, the most effective channel of communication was personal contacts among school administrators, including principals, superintendents, vocational education directors, and project directors. Reasons cited for contacting exemplary project personnel indicated a problem-solving orientation to innovation adoption. Patterns of communication revealed that school districts were more likely to adopt innovations from relatively distant schools than from adjacent neighbors.

Hull and Bina (1977) conclude that successful replication of exemplary vocational education projects requires a combination of factors. Among these are adaptation of the innovation to local needs and procurement of knowledgeable consultants to assist in the implementation.

A few researchers have attempted to describe the implementation of specific innovations in various educational environments. Dunn et al. (1974) investigated factors associated with successful implementation of a modularized career education curriculum in California elementary and junior high schools. An elaborate change model was developed and various parts of the model were tested. The key independent variable in the study was the degree of teacher involvement in curriculum development, including identification of objectives and learning activities as well as module writing. It was concluded that involvement of school staff--administrators and teachers--in the development of an innovation would increase the likelihood of its acceptance. Local and regional in-service training were effective dissemination modes and contributed to successful implementation of the innovation.

"New Pioneers," a program designed to eliminate sex bias in occupational education programs in North Carolina, is described in a case study by Smith (1977). The major objective of the project was to develop an effective strategy for reducing sex stereotyping in seven secondary school programs in occupational education. Major elements of the apparently successful implementation strategy included use of an awareness campaign, appeal to legitimate authority (Title IX), demonstration projects, and in-service education programs. However, Smith (1977:5) states that "any well-thought-out system will work, with a few dedicated people to work it, if the right approach is used." Although the author denies that the plan requires project staff with exceptional ability, the evidence cited does not seem to justify this denial.

Three studies were identified which investigated the relationship among selected organizational and personal characteristics which promote innovation in occupational education. Oscarson (1977) studied "adoption-proneness" among vocational teachers. Innovative teachers tended to be somewhat older, more likely to read professional journals, express feelings of camaraderie with academic teachers, and to be satisfied with teaching as a vocation. The low-to-moderate correlation coefficients,

ranging from .07 to .34, indicate that only a small portion of the variation in "adoption-proness" can be explained by the selected characteristics.

A study by Williams and Hull (1968) investigated personal and situational variables related to adoption of a new agricultural program in Oklahoma secondary schools. Three consecutive "summer institutes" were used to promote the diffusion and adoption of the new curriculum by high-school agriculture departments. At the conclusion of the series, a follow-up study was conducted to determine the extent of program implementation by workshop participants. The study found that the numbers of teachers and students in a school's agriculture department were the most significant of the independent variables, accounting for fifty percent of the variance. Interestingly, the attitudes of local administrators toward the innovation neither inhibited nor stimulated adoption of the curriculum.

McKinney and Westbury (1975) provide a historical case-study of change in occupational education in the Gary, Indiana, schools between 1940 and 1970. The authors argue that "change" was slow in coming to the Gary schools because of a critical lack of funds to finance innovative practices and because of an entrenched philosophy of education. An important point made in this research is that the historical context of a particular innovation has considerable influence on the process of implementation.

The authors report that William Wirt, the superintendent of the Gary schools, had all plant facilities, equipment, etc., built around his plan for education. This plan had three major components: (1) the Platoon Plan, (2) unit organization, and (3) lengthened school day and year. The facilities were built to handle the platoon plan--one-half of the school population used academic classrooms while others used shop facilities, with students switching once a day. The unit plan encouraged facilities such as shops, etc., to be used simultaneously by as many grade levels as possible.

According to McKinney and Westbury, the Gary curricula were evaluated three times between 1942 and 1957 to assess their quality. Each time the system was chastised and each time the system made attempts to amend the situation. The plan for curriculum change was "elaborately articulated...but change did not come about..." Prohibitive cost of remodeling the buildings, providing vocational teachers, equipment and supplies were cited as major causes of failure to innovate as new practices and products became available. Although vocational education was an integral part of the "Gary Plan," it was, in reality, limited to vocational arts classes and few Gary schools considered preparation for employment a legitimate goal of the school. As one evaluation report stated, the Gary philosophy took "the form of a preference for students who will enter college and an apathy toward all others" (PAS, 1955:44).

Bower's (1978) paper lends support to the conclusions of McKinney and Westbury. He states that local adoption of an innovation can be "viewed as depending upon the extent to which past and current structures influenced its active response to the problems encountered." Greiner (1967) also notes that greater weight must be attributed to the historical determinants of change processes. The Gary experience is a well-documented example of the effect of the social and organizational context of innovation adoption.

SUMMARY

This review of the literature on innovation in occupational education revealed several recurring themes. Ability to be innovative is related to (1) a perceived need to change, (2) acquisition of a well-packaged, innovative program which responds to that need, and (3) some undetermined minimal level of local commitment and administrative ability. The generalizations presented in Part III are supported by the studies reviewed here.

PART III

SOME GENERALIZATIONS ABOUT INNOVATIONS

In his discussion of a theory of innovation, Mohr (1978) points out that there are conflicts in the findings of empirical studies of innovation. A major reason for these is the lack of clear definitions of major variables associated with innovation in organizations. A possible solution to this problem is the use of "higher-order" definitions of specific, lower-level variables. This section of the paper provides a distillation of findings and recommendations, based on "higher-order" variables which appear in many reviews of the innovation literature. The generalizations presented here are organized according to whether the focus is on the implementing organization or the innovation itself.

Several reviews of the literature were consulted in the compilation of generalizable statements about innovation in schools. These include: Miles (ed. 1964), Havelock (1969), Rogers and Shoemaker (1972), Fullan and Pomfret (1977), and Glazer (1976). The articles and studies reviewed in Part II of this paper were influential in guiding our selection of variables.

This project staff identified five organizational variables which have unanimous support in the literature as factors which influence the implementation of innovation, regardless of the characteristics of the innovation itself. These are: financial resources, human resources, the planning process, communication channels and patterns and training. Each variable presented below is followed by one or more generalizations.

1. *Financial resources*

a. Innovativeness varies directly with available money. Change should not be undertaken if the school system does not have

the necessary financial and human resources to accept and sustain change.

b. Availability of funds influences the change process, but the motivation of the school system may have a strong effect.

2. *Human resources*

a. Innovation depends upon individuals within adopting organizations performing new tasks and taking on new roles.

b. A strong commitment to change based on perceived needs must exist in both the formal and informal school organization before an innovation will be successfully implemented.

c. Innovators tend to be in positions of authority and/or influence within the organization.

d. Hierarchical support will increase the likelihood of successful implementation.

e. Teachers will rely on their own experience for curriculum ideas rather than use unfamiliar materials produced by others.

f. Teachers work best with, and rely most on, fellow teachers in information sharing.

g. Experience in past change programs and expectations for future programs influence the change process.

3. *Planning*

a. Planning facilitates the implementation of innovation; and where planning is more explicit and detailed, implementation is faster and more complete.

b. Involvement and participation in planning and decision-making by those affected by a change will positively influence the process of implementation.

4. *Communications*

a. Face-to-face interaction and two-way communication are the most effective modes of conveying information.

b. Increased vertical and horizontal communications facilitate change.

c. Use of overloaded information channels will tend to hinder the change process.

d. Synergistic communication procedures enhance the adoption of innovation.

5. *Training*

a. In-service training, provided on a regular schedule, contributes to effective use of an innovation.

b. Training activities, if effectively applied, increase the likelihood of successful implementation and continuation of innovative programs.

c. Training directly related to the practical application of the new innovation increases the chances of successful implementation.

Aspects of Innovations Related to Implementation

It is evident that some innovations are more quickly adopted and enjoy wider acceptance than others. These "successful" innovations appear to have two things in common with one another: adoptability and utility. Below are generalizations about successful innovations.

1. *Utility*

a. Innovations requiring inordinate outlays of money, energy, or time by the implementing group or person are likely to be adopted slowly if at all.

b. The perceived compatibility of an innovation with an organization's goals and traditions is positively related to adoption.

c. An innovation must be perceived by the users as an improvement over existing methods.

2. *Adoptability*

   a. The greater the complexity of the innovation, the less likely it is to be implemented.

   b. An innovation which can be readily observed will be implemented more readily than one which is less clear and available.

   c. An innovation must be malleable in ways that permit adopters to make adjustments based on local needs.

   d. Innovations accompanied by supporting materials (training materials, manuals, teaching aids, etc.) will be implemented more easily than those without.

   e. Effective implementation of innovations is directly related to the extent to which the innovation is congruent with perceived needs of the user.

   f. Advocacy of the innovation by respected and credible individuals and groups increases chances of its use.

CONCLUSIONS

This review of literature suggests that effective program implementation can be engineered through close attention to (1) the innovation itself, and (2) the contextual factors which comprise the school organization. The review of the change literature on vocational education indicates that close attention must be given to the process of implementation. Financial resources must be available at the local level. Adequate local planning, in-service training and staff involvement are important elements to ensure implementation.

We have outlined theoretical perspectives on the change process and identified options in change strategy. The next step in planning for ISSOE dissemination is the selection of one of the change strategies, or the development of a tailor-made strategy which would select those parts of previous strategies which hold promise of meeting local requirements and the State Education Department's objectives.

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